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A discriminant function to classify basketball teams with and without intellectual impairment through game statistics

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Introduction

In the development of eligibility systems in basketball for athletes with Intellectual Impairment (II), previous studies have described how II-athletes perform in high level basketball. These results were compared with the literature in Able-bodied (AB) competitions. However, data from AB and II- competitions have not been previously assessed in order to identify significant differences between both competitions. This step is needed firstly, to evidence differences in AB and II-basketball and secondly, to establish evidence-based eligibility criteria.

Purpose

The first purpose of this study was to evidence differences between AB and II basketball teams' game statistics. The second purpose was to develop a reliable equation to classify teams in AB and II according to their game statistics.

Methods

Official game statistics were gathered from the World Basketball Championships for II-athletes (Ankara 2013) and from the Spanish Basketball Championships (Zaragoza 2014) for AB-athletes under 16-years old (U-16). 6 teams and 63 players with II participated in the 13 games played in Ankara 2013 and 8 teams and 93 players participated in Zaragoza 2014. Team variables gathered from the game- statistics were: two point shots scored (2PS) and missed (2PM), three point shots scored (3PS) and missed (3PM), free throws scored (FTS) and missed (FTM), offensive (OR) and defensive rebounds (DR), assists (ASS), steals (ST), turnovers (TO), fouls (FO) and blocks (BLK). A discriminant analysis was carried out in which structure coefficients (SC), centroids and non-typified coefficients were calculated.



Results

The obtained discriminant function was significant ($p < 0.001$; Eigenvalue=1.56; Wilk's Lambda=0.391; Canonical Correlation=0.78; Chi-squared=35.68) and it classified correctly 95.7% of the teams in AB and II teams. The variables which best contributed to discriminate AB and II teams were: fouls (SC=0,499); 3PS scored (SC=0,474); 3PM missed (0,369) and FT-scored (SC=0,352). The obtained centroid for II-teams was -1.071 and for AB-teams was 1.392; consequently the cut point was set at 0.1605. The classification equation was obtained using non-typified coefficients and a D-value was calculated for each team when game-related statistics were introduced in the equation. $D \text{ Value} = 2PS * 0.109 + 2PM * -0.028 + 3PS * 0.15 + 3PM * 0.013 + FTS * 0,051 + FTM * -0.44 + OR * -0.009 + DR * -0.021 + ASS * -0.111 + FO * 0.08 + ST * 0.014 + BLK * 0.045 - 3,142$ If D-value > 0.1605 the team is classified as AB-team, if D-Value < 0.1605 the team is classified as II- team.

Conclusions

Although, according to the Classification Code, eligibility systems for II-sports require pre-competition tests and individual tests, this new approach allows a team specific game analysis. The development of this function has two important implications for future research in the development of eligibility systems in II-basketball. The first implication is that this function evidences the differences in game statistics between II and AB teams. The second implication is that, in the future, discriminant analysis will let us develop reliable functions to classify teams but also athletes from a multifactorial perspective.

Keyword(s): Eligibility systems, intellectual disability, INAS, IPC

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